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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,552	02/08/2006	**Richard Harding**	MERCK-3144	9249

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
1794	

MAIL DATE	DELIVERY MODE
04/01/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,552	HARDING ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/05/09*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 17-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,17-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Withdrawn Rejections

1. The 35 U.S.C. 112, 2nd paragraph rejections of claims 1-21 are withdrawn due to Applicant's amendment dated 01/05/09.

2. The 35 U.S.C. 101 rejection of claims 16, 19 is withdrawn due to Applicant's amendment dated 01/05/09.

3. The 35 U.S.C. 102(b), 35 U.S.C. 102(e) and 35 U.S.C. 103(a) rejections of claims 1-21 in the Office action dated 10/03/08 are withdrawn due to Applicant's amendment dated 01/05/09.

New Rejections

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-7, 12-15, 17-24, 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gass (US 5,808,716) in view of Ohnishi (US 5,814,378) and O'Neill (US 2003/0021913 A1).

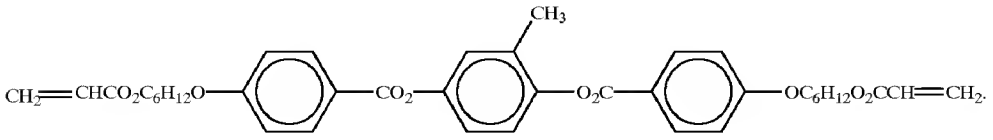
Regarding claims 1, 3-4, 12-13, Gass teaches an alignment layer for aligning liquid crystal molecules (column 5, lines 1-10), said layer comprising a polymer film containing at least one reactive compound, wherein after preparation of said alignment layer, said alignment layer contains least one reactive additive such as an acrylate

compound (alignment layers which contain reactive groups such as acrylates, column 4, lines 50-51). Gass fails to specify that the reactive acrylate compound is a reactive mesogen, let alone one of formula II or IIa of Applicant, such that the alignment layer contains unreacted polymerizable groups in the reactive mesogen additive.

However, Onishi teaches that when the reactive compound in the alignment layer is a reactive mesogen, the alignment layer has better alignment control over the liquid crystal molecules (orientation restricting force of the alignment film is sufficiently transmitted to the liquid crystal molecules, column 7, lines 10-25).

O'Neill teaches an alignment layer for aligning liquid crystal molecules ([0002]), characterized in that it comprises a reactive mesogen in monomeric, polymeric or oligomeric form (reactive liquid crystal formed from a reactive mesogen, Compound 4, [0025]) represented by formula II of Applicant where P^1 of Applicant = P^2 of Applicant = polymerizable group CH_2=$CHCO_2$-, x of Applicant = y of Applicant = 6, g^1 of Applicant = g^2 of Applicant = –O-, L^1 of Applicant = L^2 of Applicant = L^3 of Applicant = L^5 of Applicant = L^6 of Applicant = H, L^4 of Applicant = an alkyl group with 1 C atom, Z^3 of Applicant = -COO- and Z^4 of Applicant = -OCO- (Compound 4, [0025]).

(Compound 4)



Compound 4 of O'Neill is a homolog of formula IIa of Applicant, where the chain extender of $-C_6H_{12}-$ is a homolog of the $-C_3H_6-$ chain extender in formula IIa of Applicant, and is sufficiently close in structural similarity that there is a presumed expectation that the two compounds possess similar properties except for the shorter chain extension which is less flexible. See MPEP 2144.09.

Therefore, since Gass is silent regarding the type of reactive acrylate compound, it would have been necessary and hence obvious to have looked to the prior art for a suitable one. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a reactive mesogen acrylate represented by formula II of Applicant, taught by O'Neill, or formula IIa of Applicant which is an obvious homolog of the one taught by O'Neill, as the reactive acrylate compound additive in the alignment layer of Gass, in order to obtain improved alignment control over the liquid crystal molecules, as taught by Onishi, where the alignment layer contains unreacted polymerizable groups in the reactive mesogen acrylate additive.

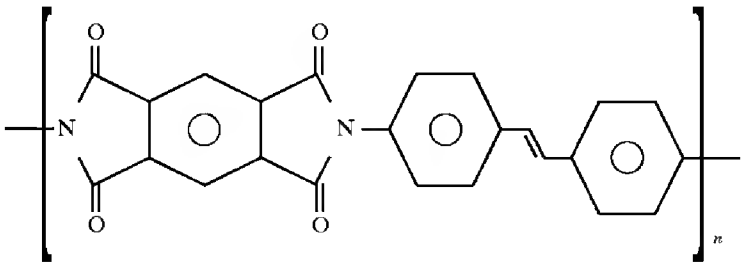
Regarding claims 2, 14, 22-24, 29-30, Gass, as modified by Onishi and O'Neill, is silent regarding the amount of the reactive mesogen acrylate additive.

However, Gass teaches that the reactive mesogen acrylate additive is added to the alignment layer to provide the desired bonding to the adjacent liquid crystal molecules (column 4, lines 50-60), thus establishing the amount of reactive mesogen acrylate additive as a result-effective variable for the purpose of providing the desired bonding to the adjacent liquid crystal molecules, so long as the desired orienting direction of the alignment layer is not adversely affected.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added the reactive mesogen acrylate additive to the alignment layer of Gass, as modified by Onishi and O'Neill, in a minor amount that is within the range of less than 50%, or less than 20%, or less than 10%, or less than 5%, or 0.5 to 4%, or 1 to 2% by weight, in order to obtain the desired bonding to the adjacent liquid crystal molecules, without adversely affecting the desired orienting direction of the alignment layer.

Regarding claim 5, Gass teaches that the alignment film is coated onto surfaces (column 5, lines 19-21) whereby a thin film coating is ordinarily achieved by solvent processing, as is well known in the art.

Regarding claims 6-7, Gass teaches that the alignment film matrix is a polyimide film having repeating units of formula A of Applicant (column 6, lines 26-36) shown below.



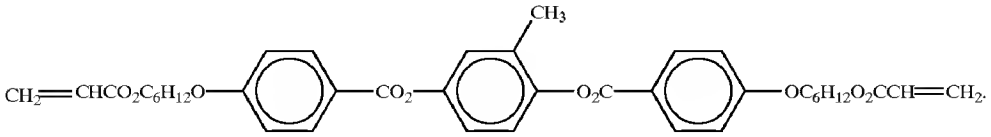
Regarding claim 15, Gass teaches a polymer precursor for preparing an alignment layer comprising a polymer film containing at least one reactive compound, wherein after preparation of said alignment layer, said alignment layer contains least one reactive additive such as an acrylate compound (alignment layers which contain reactive groups such as acrylates, column 4, lines 50-51). Gass fails to specify that the

reactive acrylate compound is a reactive mesogen, let alone one of formula II or IIa of Applicant, such that the alignment layer contains unreacted polymerizable groups in the reactive mesogen acrylate additive.

However, Onishi teaches that when the reactive compound in the alignment layer is a reactive mesogen, the alignment layer has better alignment control over the liquid crystal molecules (orientation restricting force of the alignment film is sufficiently transmitted to the liquid crystal molecules, column 7, lines 10-25).

O'Neill teaches an alignment layer for aligning liquid crystal molecules ([0002]), characterized in that it comprises a reactive mesogen in polymeric or oligomeric form (reactive liquid crystal formed from a reactive mesogen, Compound 4, [0025]) represented by formula II of Applicant where P^1 of Applicant = P^2 of Applicant = polymerizable group CH_2=$CHCO_2$-, x of Applicant = y of Applicant = 6, g^1 of Applicant = g^2 of Applicant = –O-, L^1 of Applicant = L^2 of Applicant = L^3 of Applicant = L^5 of Applicant = L^6 of Applicant = H, L^4 of Applicant = an alkyl group with 1 C atom, Z^3 of Applicant = -COO- and Z^4 of Applicant = -OCO- (Compound 4, [0025]).

(Compound 4)



Therefore, since Gass is silent regarding the type of reactive acrylate compound, it would have been necessary and hence obvious to have looked to the prior art for a suitable one. As such, it would have been obvious to one of ordinary skill in the art at

the time the invention was made, to have used a reactive mesogen acrylate taught by O'Neill, as the reactive acrylate compound additive in the polymer precursor for preparing the alignment layer of Gass, in order to obtain improved alignment control over the liquid crystal molecules, as taught by Onishi, where the alignment layer contains unreacted polymerizable groups in the reactive mesogen acrylate additive.

Regarding claims 17-18, Gass, as modified by Ohnishi and O'Neill, fails to teach in the same embodiment, a laminate comprising the alignment layer described above, and a film comprising polymerised and/or crosslinked liquid crystal material, and thus also fails to teach a method of preparing said laminate in the same embodiment.

However, Gass teaches a laminate comprising an alignment layer of a separate embodiment and a film comprising polymerised and/or crosslinked liquid crystal material, for the purpose of stabilizing the sublayers in the bulk of the liquid crystal layer to enhance resistance to mechanical damage (network structure may also be formed in the bulk of the FLC layer because of bonding between reactive mesogens, column 5, lines 10-16), where the method of preparing the laminate comprises the step of providing a layer of polymerizable liquid crystal material onto an alignment layer and aligning the liquid crystal material into uniform orientation (filling the cell with the FLC material, the smectic structure is aligned, column 5, lines 1-5) followed by the step of polymerizing or crosslinking the liquid crystal material (network structure may also be formed in the bulk of the FLC layer because of bonding between reactive mesogens, column 5, lines 10-16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have prepared a laminate by a method that comprises a step of providing a layer of polymerizable liquid crystal material onto the alignment layer that contains the reactive mesogen acrylate with unreacted polymerizable groups, of Gass, as modified by Onishi and O'Neill, and aligning the liquid crystal material into uniform orientation followed by the step of polymerizing or crosslinking the liquid crystal material, to prepare a laminate comprising the alignment layer and a film comprising the liquid crystal material that is polymerised and/or crosslinked, in order to obtain a laminate with enhanced resistance to mechanical damage, as taught by Gass.

Regarding claims 19-21, Gass teaches that the alignment layer is disposed in a liquid crystal display device (column 4, lines 17-22) which is an electrooptical application.

Regarding claim 27, Onishi teaches that the reactive groups can be part of the polymer, for the purpose of providing improved alignment control over the liquid crystal molecules (orientation restricting force of the alignment film is sufficiently transmitted to the liquid crystal molecules, column 7, lines 10-25). Thus the alignment layer of Gass, as modified by Onishi and O'Neill, can be obtained from a polymer precursor to which the reactive mesogen acrylate is added before processing or polymerizing.

Regarding claim 28, Gass teaches that the reactive groups can be part of a compound in the alignment layer (unsaturated compounds, column 7, lines 35-40) after preparation of the alignment layer (column 4, lines 50-51). Thus the alignment layer of

Gass, as modified by Onishi and O'Neill, can be obtained by adding the reactive mesogen acrylate to the polymer matrix.

5. Claims 8-11, 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gass in view of Onishi and O'Neill as applied to claims 1-7, 12-15, 17-24, 27-30 above, and further in view of Ichimura (US 6,001,277).

Gass, as modified by Onishi and O'Neill, teaches the alignment layer comprising a polymer film containing a reactive mesogen acrylate additive, where the polymer film can be a polyimide film, as discussed above.

Regarding claims 8-9, Gass fails to teach that the polymer film can also be a solvent processed cellulose based film, let alone one that is a triacetate cellulose film or a diacetate cellulose film.

However, Ichimura teaches that the polymer film matrix for an alignment layer can be a cellulose based film (column 7, lines 25-32) that is solvent processed (dissolved, solution obtained was spin-coated, column 45, lines 60-65) instead of a polyimide film (column 27, lines 5-41) for the purpose of providing the desired alignment properties. Ichimura teaches acetyl cellulose as a more specific type of cellulose (column 7, lines 28-30), of which triacetate cellulose and diacetate cellulose are the most common and hence the most obvious species.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a solvent processed cellulose based film in lieu of the polyimide film as the polymer film matrix of the alignment layer of Gass,

where the cellulose based film is a common triacetate cellulose film or diacetate cellulose film, in order to obtain the desired alignment properties, as taught by Ichimura.

Regarding claims 10-11, Gass fails to teach that the alignment layer is a command layer comprising an isomerizable compound such as an azobenzene, wherein changes of the orientational direction of the isomerizable compound induce a specific alignment of the liquid crystal material coated onto said alignment layer.

However, Ichimura teaches that isomerizable azobenzene is added to the alignment layer, which renders said alignment layer a command layer wherein changes in the orientational direction of the azobenzene induce a specific alignment of a liquid crystal material coated onto said alignment layer, for the purpose of providing the desired ease of alignment (column 12, lines 10-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added isomerizable azobenzene to the alignment layer of Gass, wherein changes of the orientational direction of the isomerizable compound induce a specific alignment of the liquid crystal material coated onto said alignment layer, in order to obtain the desired ease of alignment, as taught by Ichimura.

Regarding claims 25-26, Ichimura teaches that the polymer film matrix of the alignment layer can be a cellulose-based one (column 7, lines 25-32) such as an acetyl cellulose (column 7, lines 28-30), for the purpose of providing the desired alignment properties. Gass, as modified by Ichimura, fails to disclose the birefringence of the cellulose-based alignment layer.

However, acetyl cellulose such as triacetate cellulose or diacetate cellulose is commonly selected for use as an optically isotropic film in optical applications. Thus the cellulose-based alignment layer of Gass, as modified by Ichimura, is expected to have a low birefringence that is within the claimed range of less than 0.05 or less than 0.005, in the absence of a showing otherwise.

Response to Arguments

6. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/
Examiner, Art Unit 1794

/KEITH D. HENDRICKS/
Supervisory Patent Examiner, Art Unit 1794